

Claims

- [c1] 1. An internal hub transmission for a bicycle comprising:
 - a drive member rotatably supported around a hub axle;
 - a hub body rotatably supported around the hub axle;
 - a planetary gear mechanism that communicates rotational force from the drive member to the hub body through a plurality of power transmitting paths;
 - a clutch member that controls the planetary gear mechanism; and
 - a first one-way clutch mechanism disposed in a force transmission path between the drive member and the clutch member.
- [c2] 2. The transmission according to claim 1 wherein the first one-way clutch mechanism comprises:
 - a support disposed between the drive member and the clutch member; and
 - a one-way clutch member disposed between one of a) the support and the drive member; and b) the support and the clutch member.
- [c3] 3. The transmission according to claim 2 wherein the one-way clutch member comprises a pawl.

- [c4] 4. The transmission according to claim 2 wherein the one-way clutch member is disposed between the support and the drive member.
- [c5] 5. The transmission according to claim 4 wherein the support is spline-connected with the clutch member.
- [c6] 6. The transmission according to claim 5 wherein the clutch member is axially slidale relative to the support.
- [c7] 7. The transmission according to claim 4 wherein the one-way clutch member comprises a pawl.
- [c8] 8. The transmission according to claim 7 wherein the pawl is mounted to one of the support and the drive member and is biased to engage a ratchet tooth disposed on the other one of the support and the drive member.
- [c9] 9. The transmission according to claim 8 wherein the pawl is structured to rotationally fix the support relative to the drive member when the drive member rotates in one direction and to allow relative rotation between the support and the drive member when the drive member rotates in an opposite direction.
- [c10] 10. The transmission according to claim 2 wherein the planetary gear mechanism comprises:

a sun gear;
a ring gear rotatably supported around the hub axle;
a planet gear carrier rotatably supported around the hub axle; and
a planet gear rotatably supported to the planet gear carrier, wherein the planet gear engages the sun gear and the ring gear.

- [c11] 11. The transmission according to claim 10 further comprising a second one-way clutch disposed in a force transmission path between the support and the ring gear.
- [c12] 12. The transmission according to claim 11 wherein the second one-way clutch comprises a pawl.
- [c13] 13. The transmission according to claim 12 wherein the pawl is mounted to one of the support and the ring gear and is biased to engage a ratchet tooth disposed on the other one of the support and the ring gear.
- [c14] 14. The transmission according to claim 10 further comprising a second one-way clutch disposed in a force transmission path between the ring gear and the hub body.
- [c15] 15. The transmission according to claim 14 wherein the second one-way clutch comprises a pawl.

- [c16] 16. The transmission according to claim 15 wherein the pawl is mounted to one of the ring gear and the hub body and is biased to engage a ratchet tooth disposed on the other one of the ring gear and the hub body.
- [c17] 17. The transmission according to claim 16 further comprising a switching member operated by the clutch member to selectively disengage the second one-way clutch so that the ring gear is allowed to rotate relative to the hub body.
- [c18] 18. The transmission according to claim 2 wherein the clutch member is spline-connected with the planet gear carrier at least part time.
- [c19] 19. The transmission according to claim 1 wherein the drive member includes a sprocket-supporting portion structured to support at least one sprocket, and further comprising:
 - a first bearing assembly rotatably supporting the drive member on the hub axle; and
 - a second bearing assembly rotatably supporting the drive member on the hub axle.
- [c20] 20. The transmission according to claim 19 wherein the first bearing assembly comprises:
 - an inner race disposed about an outer peripheral surface

of the hub axle; and
an outer race disposed about an inner peripheral surface
of the drive member.

- [c21] 21. The transmission according to claim 19 wherein the first bearing assembly is approximately axially centered relative to the sprocket-supporting portion.
- [c22] 22. The transmission according to claim 21 wherein the second bearing assembly is located at an axially outer position of the drive member.
- [c23] 23. An internal hub transmission for a bicycle comprising:
 - a drive member rotatably supported around a hub axle, wherein the drive member includes a sprocket-supporting portion structured to support at least one sprocket;
 - a first bearing assembly rotatably supporting the drive member on the axle;
 - a second bearing assembly rotatably supporting the drive member on the hub axle;
 - a hub body rotatably supported around the hub axle;
 - a planetary gear mechanism that communicates rotational force from the drive member to the hub body through a plurality of power transmitting paths; and
 - a clutch member that controls the planetary gear mecha-

nism.

- [c24] 24. The transmission according to claim 24 wherein the sprocket-supporting portion of the drive member is structured to support a plurality of sprockets.
- [c25] 25. The transmission according to claim 23 wherein the first bearing assembly is located at an axially outer position of the drive member, and wherein the second bearing assembly is located axially inward of the first bearing member.
- [c26] 26. The transmission according to claim 25 wherein the second bearing assembly is approximately axially centered relative to the sprocket-supporting portion of the drive member.
- [c27] 27. The transmission according to claim 26 wherein the sprocket-supporting portion of the drive member is structured to support a plurality of sprockets.